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09/436,618	11/09/1999	MICHAEL A. B. PARKES	200352	6893

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EXAMINER
ALI, SYED J

ART UNIT	PAPER NUMBER
2127	

DATE MAILED: 07/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/436,618	Applicant(s) PARKES ET AL.
	Examiner Syed J Ali	Art Unit 2127

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *20 May 2003* .

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-38* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-38* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.

    If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All b) ☐ Some * c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

    a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *2* .

4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other:

DETAILED ACTION

1.   This office action is in response to Amendment A, paper number 5, which was received May 20, 2003.   Applicant's arguments have been fully considered but they deemed to be moot in view of the new ground of rejection.   Claims 1-38 are presented for examination.

2.   The text of those sections of Title 35, U.S. code not included in this office action can be found in a prior office action.

Claim Rejections - 35 USC § 112

3.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4.   Claim 6 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5.   Claim 6 recites the limitation "the second are" in line 4.   There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

6.   Claims 1, 6, 10-11, 28, 32, 36-37 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Hanif et al. (USPN 5,796,954) (hereinafter Hanif) in view of Gregor et

al. (USPN 5,553,305) (hereinafter Gregor).

        As per claim 1, Hanif discloses a method of carrying out a procedure on a

computer system having a memory, the memory containing user context data and global

data, comprising:

        executing a first server, wherein the first server defines a computer-executable

function for performing a first sub-task of the procedure (col. 1 line 65 - col. 2 line 5,

"The file server includes file server software that is implemented as a multithreaded

process. Network tasks are broken into sub-tasks and assigned to individual threads for

further processing") ;

        manipulating the global data to carry out the first sub-task (col. 5 lines 19-40,

"One aspect of the present invention is to increase the throughput of the file server

software 24' using multiple threads of execution. According to the present invention...a

second plurality of global threads 204 is assigned to the global queue 200 for processing

command-type requests");

        sending the user context data to a second server (col. 6 lines 12-29, "the work of

processing requests is divided into two phases, initialization and queuing, to further

improve performance", "The last step 256 in the initialization phase is to make N number

of SPGetRequest calls to the ATP to initiate the listening of requests", wherein the

process of making SPGetRequest calls completes the initialization, i.e., the first sub-task,

and the calls to the ATP sends local, i.e., user, data to the second server to complete

queuing, i.e., the second sub-task);

executing the second server, wherein the second server defines a computer-

executable function for performing a second sub-task of the procedure (col. 6 lines 30-38,

"the ATP 120 receives the request from the SLS 170 in step 270, and then the ASP 130

places the request into the local queue 190 for processing"); and

manipulating the global data to carry out the second sub-task using the user

context data (col. 6 lines 30-38, "the ATP 120 receives the request from the SLS 170 in

step 270, and then the ASP 130 places the request into the local queue 190 for

processing").

Hanif does not specifically disclose that the first and second servers are optimized

to execute in the cache.

Gregor discloses that the first and second servers are optimized to execute in the

cache (Abstract, "Before execution of a thread commences, a determination is made as to

whether all of the required resources for execution of the thread are available in a cache

local to the processing element. If the resources are not available, then the resources are

fetched from main storage and stored in one or more local caches before execution

begins").

It would have been obvious to one of ordinary skill in the art to combine Hanif

and Gregor since executing a thread in cache is much faster than fetching data from main

memory for each operation. Since Hanif discloses executing servers as multithreaded

processes, Gregor fits well within the confines of Hanif since Gregor is related to

optimizing execution of threads by fetching resources from main memory and storing

them in cache. Therefore, the combination of Hanif and Gregor would allow the dividing

of a procedure into sub-tasks, operating on both global and user data, and optimized to

execute in cache.

As per claim 6, "Official Notice" is taken that the method of claim 1, wherein the

computer system has a first CPU and a second CPU, and the cache is comprised of a first

area usable by the first CPU and a second area usable by the second CPU, and the

executable code of the first server is optimized to fit in the first area and the executable

code of the second server is optimized in the second area would have been obvious to one

of ordinary skill in the art in view of Gregor. Specifically, Gregor discloses optimizing

thread execution in the cache in a multiprocessor system (Fig. 1 elements 14, wherein

each of element 14 is a processing element, and it is well known that caches are

associated with a processor). Furthermore, since multiple processing elements are

shown, it would have been obvious that each has its own assigned cache, and that the

execution optimization, as discussed above in reference to claim 1, would execute in the

respective caches.

As per claim 10, the modified Hanif discloses the method of claim 1, wherein the

computer system has a plurality of CPUs, and at least one server executes on only one

CPU at a time (Gregor discloses a multiprocessor system in Fig. 1, and Hanif discloses

multiple servers executing together to perform a larger task. That is, a request is made,

and a response is made to service that request. It is not unreasonable to presume that in

the case of data dependencies, etc., there may be cases when only one of the servers can

execute at a time to preserve data integrity).

As per claim 11, the modified Hanif discloses the method of claim 1, wherein the

computer system has a plurality of CPUs, and at least two instances of one of the servers

execute concurrently on different CPUs (see discussion of claim 10 pertaining to

multiprocessor systems. Furthermore, Hanif discloses servers made up of multithreaded

processes, which by definition, support execution of concurrent threads).

As per claim 28, it is rejected for similar reasons as stated above for claim 1.

Specifically, since Hanif and Gregor are specifically related to system and methods in a

computer system, it is inherent that a computer-readable medium having computer-

executable instructions for performing the method of claim 1 must exist.

As per claims 32 and 36-37, all of the limitations therein are similar to those of

claims 6, and 10-11. Therefore, the discussion of claims 6 and 10-11 provide the basis

for rejection of the present claims as well.

7.   Claims 2-4, 13-16, 18, 20-21, 23-27, 29-31 are rejected under 35 U.S.C. 103(a) as

being unpatentable over Hanif in view of Gregor in view of Ghodrat et al. (USPN

6,425,021) (hereinafter Ghodrat).

As per claim 2, the modified Hanif does not specifically disclose the method of claim 1, further comprising storing the user context data in a work packet and sending the work packet from the first server to the second server, wherein the work packet contains an action code for describing an action to be performed by the second server.

Ghodrat discloses the method of claim 1, further comprising storing the user context data in a work packet and sending the work packet from the first server to the second server, wherein the work packet contains an action code for describing an action to be performed by the second server (col. 4 lines 36-50, "the asynchronous receive DMA is located within receive DMA (RDMA) unit 314 and contains two DMA contexts, a request handler and a response handler", wherein the request handler submits a work packet to a second context containing an action code telling the second server how to respond to the request).

It would have been obvious to one of ordinary skill in the art to add Ghodrat to the modified Hanif since Hanif discloses a way of processing requests by having one server handle the request and another handle the response. By adding Ghodrat, a way of transferring the request calls in a data structure such as a packet is provided.

As per claim 3, Ghodrat discloses the method of claim 2, wherein the work packet contains a reply state, and the method further comprises: causing the second server to update the work packet by replacing the value contained in the action code with the value contained in the reply state; and causing the second server to send the updated work packet back to the first server (col. 4 lines 36-50, "the asynchronous receive DMA is located within receive DMA (RDMA) unit 314 and contains two DMA contexts, a

request handler and a response handler", wherein Ghodrat provides a way of transferring packets, and provides a response handler for such a transaction). Further, as discussed above, Hanif provides a way of handling requests and responses without specifying the mode of transferring data. Rather, Hanif simply refers to the requests as "SPGetRequest calls". The method of Ghodrat provides a way of defining a data structure that could be implemented in Hanif to transfer retrieved data back to the first server upon issuance of the request for retrieval from memory.

As per claim 4, Ghodrat and Hanif disclose the method of claim 1, further comprising: in response to receiving a first work packet containing the user context data; causing the first server to partly perform the first sub-task using the first work packet (see above discussion of claim 1); sending a second work packet containing the user context data from the first server to the second server; causing the second server to perform the second sub-task using the second work packet and store a result of the second sub-task in the second work packet; and sending the second work packet from the second server to the first server, wherein the result is useable by the first server to complete the performance of the first sub-task (col. 4 lines 36-50, "the asynchronous receive DMA is located within receive DMA (RDMA) unit 314 and contains two DMA contexts, a request handler and a response handler", wherein Ghodrat describes a way of transferring data packets of different contexts through a single interface, and used in combination with the request calls of Hanif, allows a way of splitting requests and responses into sub-tasks, thereby allowing different multithreaded processes to perform various sub-tasks of the procedure).

As per claims 13-16, 18, and 20-21, all of the limitations therein are similar to those of claims 1-4, 6, and 10-11. Therefore, the discussion of claims 1-4, 6, and 10-11 provide the basis for rejection of the present claims as well.

As per claim 23-25, all of the limitations therein are similar to those of claims 1-3. Specifically, Hanif discloses a computer-readable medium defining servers for performing sub-tasks of a procedure. In addition, Ghodrat discloses a work packet for transferring user context information. Therefore, the discussion of claims 1-3 provide the basis for rejection of the present claims as well

As per claims 26-27, all of the limitations therein are similar to those of claims 1-4. Therefore, the discussion of claims 1-4 provide the basis for rejection of the present claims as well. The disclosure of all of Hanif, Gregor, and Ghodrat are specifically related to computer systems, particularly networks and data transfer. Therefore, it is inherent that a computer-readable medium must exist to store various data as well as instructions for executing the above described methods.

As per claims 29-31, all of the limitations therein are similar to those of claims 2-4. Therefore, the discussion of claims 2-4 provide the basis for rejection of the present claims as well.

8.   Claims 5, 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over
Hanif in view of Gregor in view of Ghodrat and further in view of Austvold et al. (USPN
6,266,708) (hereinafter Austvold).

As per claim 5, the modified Hanif does not specifically disclose the method of
claim 4, wherein the second work packet is linked as a child to the first work packet.

Austvold discloses the method of claim 4, wherein the second work packet is
linked as a child to the first work packet (col. 3 lines 9-45, "a WorkUnit object could
further subdivide the work packet down into smaller multiple work packets represented
by other WorkUnit objects. These WorkUnit objects have a parent-child relationship in
which a child WorkUnit will return to its parent WorkUnit when the child WorkUnit is
complete with its specific work packet").

It would have been obvious to one of ordinary skill in the art to add Austvold to
the modified Hanif since the disclosure of Austvold provides a way of permanently
linking a work request with its response. Since Hanif deals mainly with such requests
and responses, the disclosure of Austvold would fit in well with Hanif thereby allowing a
way of ensuring that a response to a request is properly handled.

As per claim 17 all of the limitations therein are similar to those of claim 5.
Therefore, the discussion of claim 5 provides the basis for rejection of the present claim
as well.

9.   Claims 7 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Hanif in view of Gregor in view of Vitter et al. (USPN 5,485,609) (hereinafter Vitter).

As per claim 7, the modified Hanif does not specifically disclose the method of

claim 1, wherein the procedure is a search of a database index tree containing a plurality

of nodes, the first sub-task is to examine a node and the second sub-task is to perform an

input/output operation for retrieving the node from memory and storing the node in

cache.

Vitter discloses disclose the method of claim 1, wherein the procedure is a search

of a database index tree containing a plurality of nodes, the first sub-task is to examine a

node and the second sub-task is to perform an input/output operation for retrieving the

node from memory and storing the node in cache (col. 3 line 61 - col. 4 line 3, "For

caching, the data structure is paged. It is assumed that every node of the tree, except may

the root, fits in one page of memory.", "Pages containing nodes not in cache are

maintained in a larger secondary memory, e.g., a disk or even in a database. When such a

node is required, it is paged or fetched into cache").

It would have been obvious to one of ordinary skill in the art to add Vitter to the

modified Hanif since caching allows a process to execute much faster than retrieving data

from memory. Various techniques are known that predict when a node may need to be

fetched. Furthermore, this fits well within the disclosure of Hanif since Hanif discloses

breaking a procedure up into subtasks. In this regard, it is possible that one sub-task can

retrieve data from memory and place it in cache, while the other sub-task concurrently is

executing on data already stored in cache.

As per claim 33, all of the limitations therein are similar to those of claim 7. Therefore, the discussion of claim 7 provides the basis for rejection of the present claims as well.

10.   Claims 8, 19, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hanif in view of Gregor in view of Vitter and further in view of Ghodrat.

The combination of Hanif, Gregor, Vitter, and Ghodrat show all the limitations of claim 8. Specifically, Vitter discloses determining if a node is in cache, and if not retrieving the node from the database in main memory and putting the node into cache (see discussion of claim 7). Furthermore, Ghodrat discloses the use of work packets executing on different contexts to service requests and receive responses (see discussion of claim 2). It would have been obvious to one of ordinary skill in the art to combine these references to arrive at the claimed invention since it would allow a way of breaking a procedure such as operating on a specific portion of a database into separate tasks, thereby reducing overhead and improving performance. By allowing this execution to take place in the cache, the performance is further improved. Also, sending requests and responses through work packets allows a standardized data structure to perform all actions, therefore increasing the scalability of the system.

As per claim 19 all of the limitations therein are similar to those of claim 7. Therefore, the discussion of claim 7 provides the basis for rejection of the present claim as well.

As per claim 34, all of the limitations therein are similar to those of claim 8. Therefore, the discussion of claim 8 provides the basis for rejection of the present claims as well.

11.   Claims 9 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hanif in view of Gregor in view of Vitter in view of Ghodrat and further in view of Austvold.

As per claim 9, Austvold discloses the method of claim 8, wherein the first work packet contains a reference to a parent work packet (col. 3 lines 9-45, "a WorkUnit object could further subdivide the work packet down into smaller multiple work packets represented by other WorkUnit objects. These WorkUnit objects have a parent-child relationship in which a child WorkUnit will return to its parent WorkUnit when the child WorkUnit is complete with its specific work packet").

It would have been obvious to one of ordinary skill in the art to add Austvold to the modified Hanif since the disclosure of Austvold provides a way of permanently linking a work request with its response. Since Hanif deals mainly with such requests and responses, the disclosure of Austvold would fit in well with Hanif thereby allowing a way of ensuring that a response to a request is properly handled.

As per claim 35, all of the limitations therein are similar to those of claim 9. Therefore, the discussion of claim 9 provides the basis for rejection of the present claims as well.

12.   Claims 12, 22, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hanif in view of Gregor in view of Ghodrat in view of Doi et al. (USPN 6,298,382) (hereinafter Doi).

As per claim 12, Doi teaches the method of claim 1, wherein the computer system has a first CPU and a second CPU, and the work packet has a designated value, and wherein one of the servers executes on the first CPU when the designated value falls within a first range and executes on the second CPU when the designated value falls within a second range. Specifically, Doi discloses prior art (fig. 9, col. 2 lines 55-62, "there frequently occurs a case that the retrieving server (processor) the retrieval data belongs to differs from the retrieving server (processor) which conducts the retrieval processing of that retrieval data", wherein when a retrieval request is submitted, there is communication between the retrieval servers so that when a request is issued for which the data falls in a particular range, the correct retrieval server performs the request). In this sense, this communication allows for specific processors to conduct retrieval on a specific range, and if that range is not allocated to that server, the communication link allows the request to be handled correctly.

It would have been obvious to one of ordinary skill in the art to add Doi to the modified Hanif since both pertain to information retrieval methods, as well as dividing that information retrieval into sub-tasks for simplified processing. Furthermore, Doi provides the added benefit of allowing processors to only search out data on specific ranges, thereby increasing the predictability of the data retrieval, and therefore making caching of data a quicker, more reliable process.

As per claim 22 all of the limitations therein are similar to those of claim 12. Therefore, the discussion of claim 12 provides the basis for rejection of the present claim as well.

As per claim 38, all of the limitations therein are similar to those of claim 12. Therefore, the discussion of claim 12 provides the basis for rejection of the present claims as well.

Conclusion

13.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
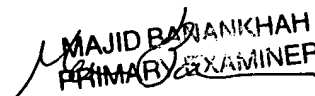
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Syed J Ali whose telephone number is (703) 305-8106. The examiner can normally be reached on Mon-Fri 8-5:30, 1st Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William A Grant can be reached on (703) 308-1108. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-7239 for regular communications and (703) 746-7238 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Syed Ali
July 23, 2003

MAJID BANIKHAH
PRIMARY EXAMINER